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Waltz Quick Start
Technical Report 23-96

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1 Introduction

The Waltz Quick Start document describes by diagrams the important functions of the Waltz Visualization System [Rob95]. Waltz is a tool to visualize three dimensional data and reads special reference files containing details of the data file, path name, dimensions and aspect ratios of the data. Waltz (as the name suggests) contains three parts: *Generalization*, *Specialization* and *Abstraction*. For a more detailed explanation of the facilities and functions of the Waltz visualization system refer to the Waltz User Manual [Rob96].

- The Generalization Process splits the data into spatially connected groups.
- A specialization is formed from a subset (selection) of these groups.
- The results are displayed in multiple abstract views of the same data. These abstractions are formed by losing or augmenting the data to facilitate in the understanding of the data.

Waltz implicitly connects the abstractions together as Linkages. By default most of the Linkages between the different abstractions are switched on; they are turned off by using the Linkages Form.

1.1 Starting a Waltz Session

A Waltz session is started by typing the command:

```
% waltz
```

1.2 Finishing a Waltz Session

The session is ended by selecting the **Quit** option from the **File** menu at the top of the Waltz canvas; or by typing **Alt q** (the hot key configuration of the menu command).









1.3 User Hints

The *Specialization* process encourages a tree hierarchy. Waltz provides the layout and 'data exporting' to support this process. There are two main methods of using Waltz either (1) the data is grouped into a few groups, some of these are selected and exported to the following level and the data is further generalized and specialized; or (2) the data is grouped into many groups and small subsets of this generalization are specialized into multiple Grouped Abstraction Child modules.

1.4 This Document

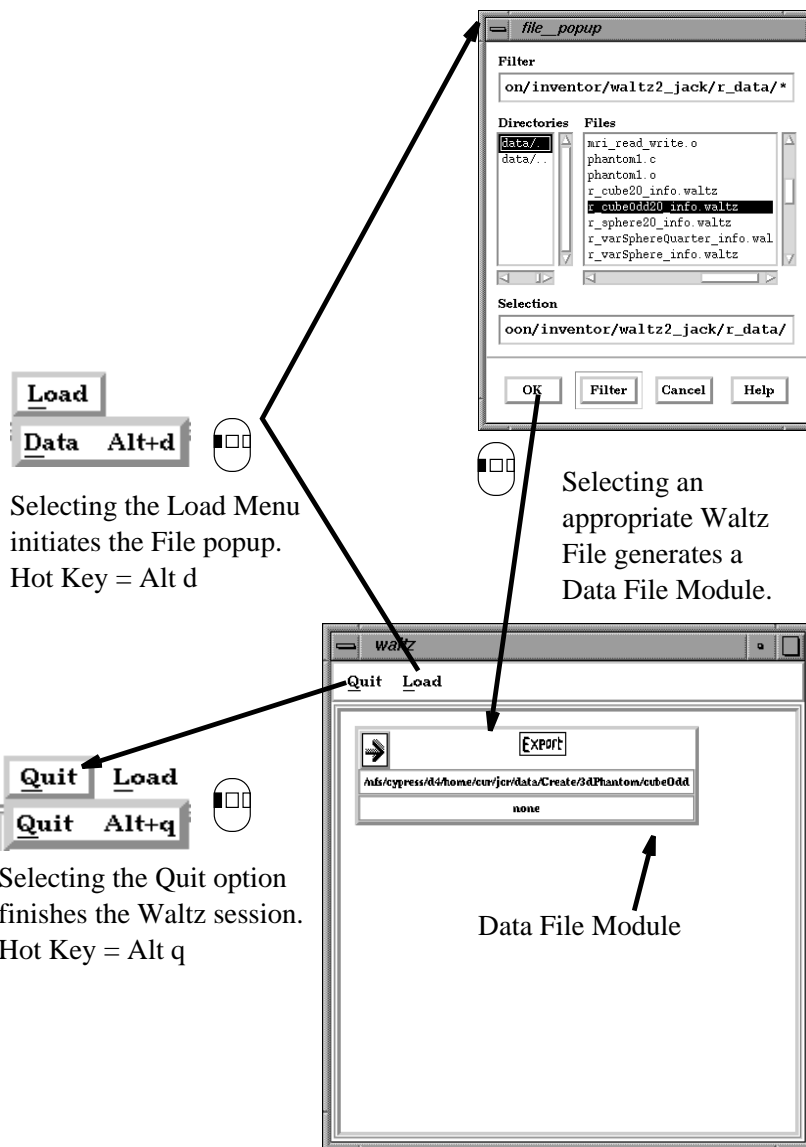
This document uses screen shots of the Waltz Visualization System with labels and icons to describe the pull-down and actions of the system. The icons are described below:

Mouse Control		Keyboard Control	
Mouse Button Press	Left 	Keyboard Ctrl Key	Ctrl +
	Middle 	Keyboard Alt Key	Alt +
	Right 	Keyboard Shift Key	Shift +
Press Mouse Button and Drag 	Keyboard Arrow Keys 	Keyboard Enter Numbers 	



2 Loading the Data

Three dimensional Data files can be loaded into Waltz using the **Data** menu pulled-down from the **Load** menu option on the top of the Waltz canvas. The Waltz system reads specific Waltz data files with a specific string **Waltz.1.0** at the top of the file. Loading a data file creates a Data File module (shown in light-pink on the Waltz canvas) at the top of the canvas.

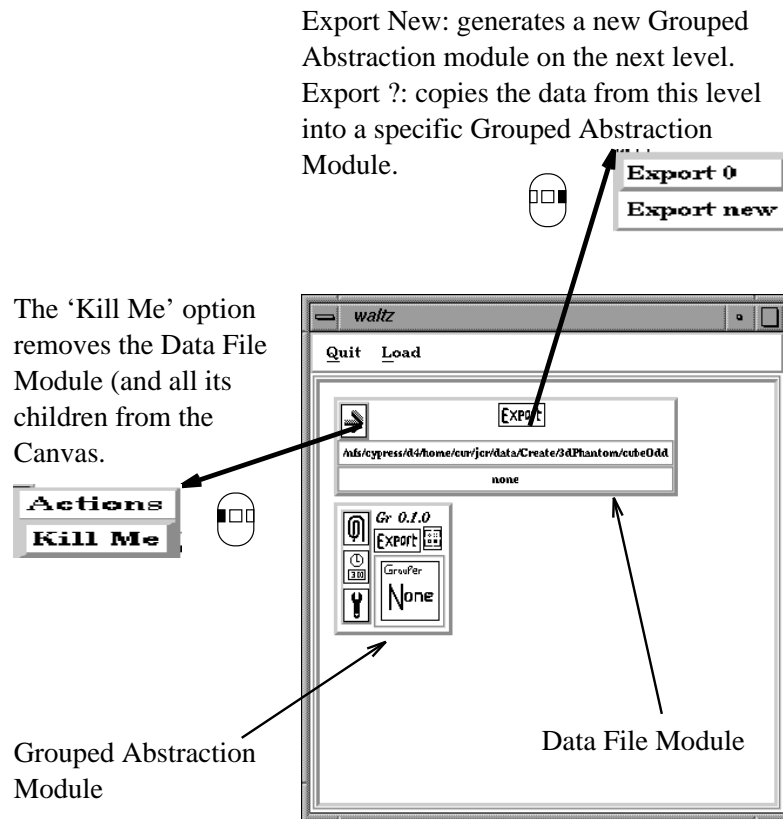




3 Controlling the Data File Module

When the data has been successfully read in a Data File Module is created. This resides at the top level on the Waltz canvas (the Canvas may need to be resized). This module displays the name of the data file and provides functions to generate multiple data paths or 'kill' all the paths corresponding to this Data File Module.

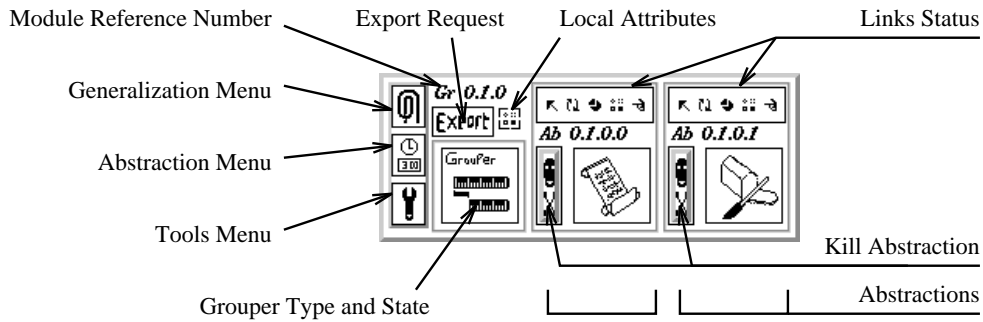
To control, generalize and view the data a Grouped Abstraction Module is needed. The module is generated by exporting the data from the Data File Module. The right mouse button on the Export bitmap creates a popup window. Export new generates the Grouped Abstraction Module. Export ? copies the data from this level into a specific Grouped Abstraction Module.



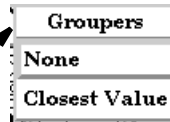
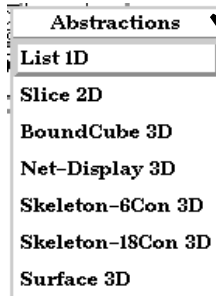


4 The Grouped Abstraction Module

The Grouped Abstraction Module provides most of the controls to generate groupings and abstractions on the data. The user is encouraged to use the Grouped Abstraction Modules as visualization history modules, holding the past visualization experiments.

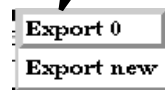
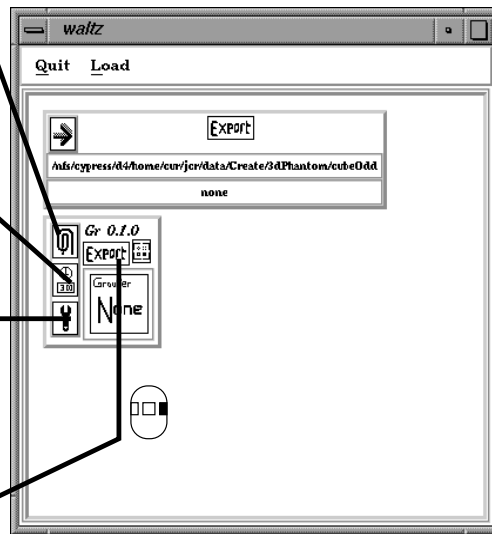
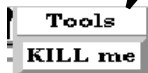


Any amount and any types of abstractions can be added to the Grouped Abstraction Module.



Only one grouper is used per Grouped abstraction Module. The current grouper is replaced by the selected grouper.

Selecting 'Kill me' causes this and other children to be removed from the Canvas.

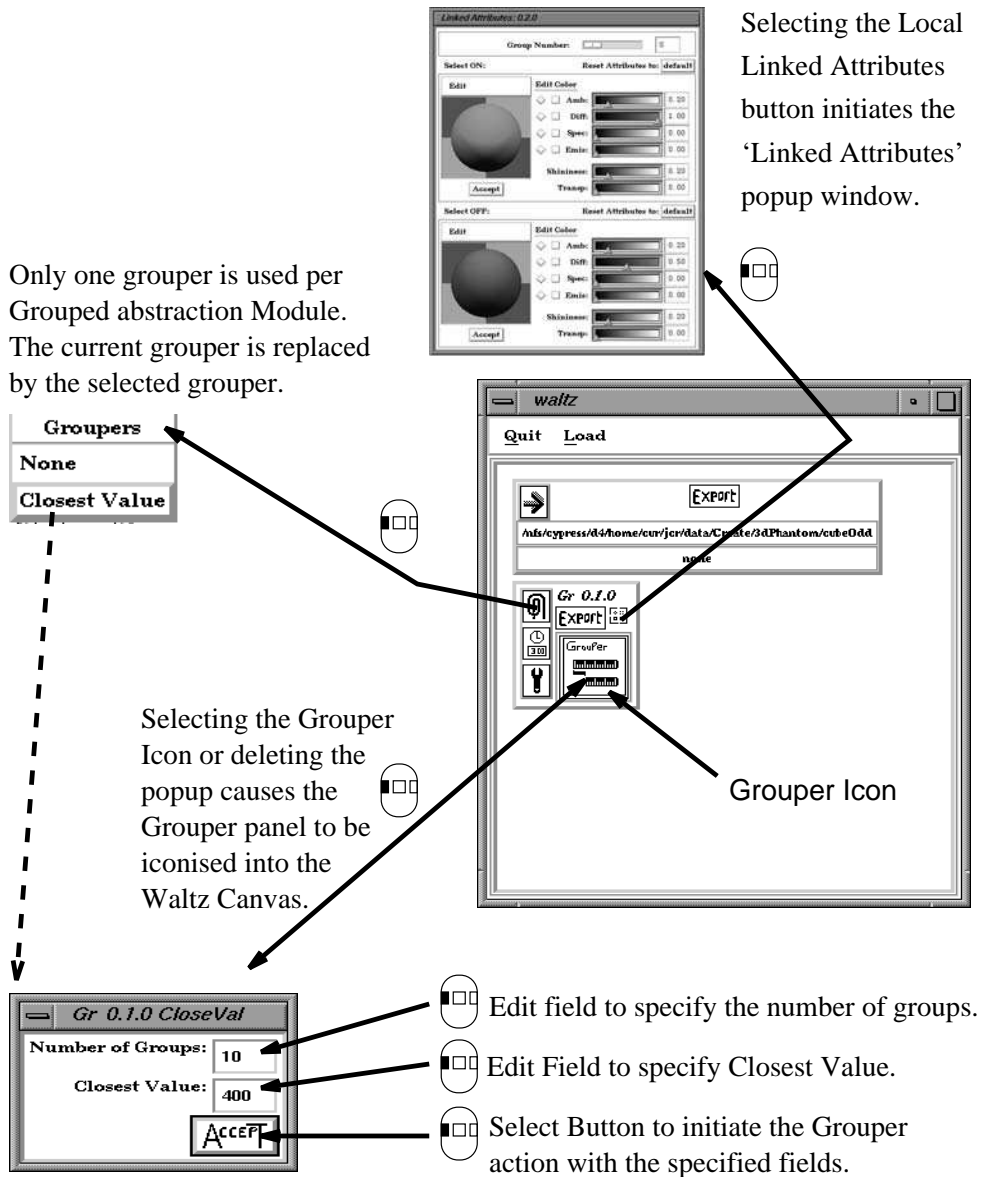


The selected data is exported to the next level.
 If nothing is selected all the groups are copied through.
 Export New creates a new Grouped Abstraction Module.
 Export ? copies the current groups to the child Grouped Abstraction Module.



5 Controlling the Grouper Action

The Grouper popup is initiated by selecting the “Closest Value” option from the Grouper Menu. The Closest Value Grouper generalizes the data into groups.





6 Initiating an Abstraction

Abstractions are added to a Grouped Abstraction Module by selecting the required option from the “Abstractions” menu. Each Link mechanism between abstractions (if appropriate) are by default linked together and are unlinked using the “Link States Form” and cursor selections.

The diagram illustrates the workflow for initiating an abstraction. It features several key components:

- Abstractions Menu:** A central menu listing options: List 1D, Slice 2D, BoundCube 3D, Net-Display 3D, Skeleton-6Con 3D, Skeleton-18Con 3D, and Surface 3D. Arrows point from this menu to individual abstraction icons.
- Linkages States Form:** A dialog box titled "Linkages States: 0.1.0.0" with a "Local Self" section. It contains checkboxes for "Linked Selection", "Linked Global Transform", "Linked Group Transform", "Linked Attributes", and "Linked Data Probes". A "Link Status" field is at the bottom. A "Toggle Link States Button" is shown pointing to this form.
- Main Software Window:** A window titled "waltz" with a menu bar (Quit, Load) and a toolbar. It contains a "Data File Module" (Export button), a "Grouped Abstraction Module" (containing several abstraction icons), and a "Select Abstraction Bitmap to Iconise Abstraction" button. A "Select Button to remove abstraction" is also indicated.

Text annotations provide further context:

- "Selecting the appropriate menu initiates an abstraction in the current Grouped Abstraction Module." (points to the Abstractions menu)
- "Toggle Link States Button on any abstraction To popup Link States Form." (points to the toggle button)
- "Data File Module." (points to the Export button)
- "Grouped Abstraction Module." (points to the abstraction icons)
- "Select Button to remove abstraction." (points to a button)
- "Select Abstraction Bitmap to Iconise Abstraction" (points to a button)



7 Editing the Link Form and Linked Attributes

The 'Self' linked attributes can be changed by selecting the Linked Attributes button (above the Grouper Icon, see Section 5). The Self Linked attributes are altered from the Link form, as shown below:

When Linked Attributes is at the 'Self' position: Toggle Change button to initiate Linked Attributes Popup.

Switch between local and Self Linkages for each of the five Link types.

Toggle the Link Status Button (on the Canvas) of any abstraction to popup the Link Status Form.

The diagram illustrates the process of editing linked attributes. It features three main windows:

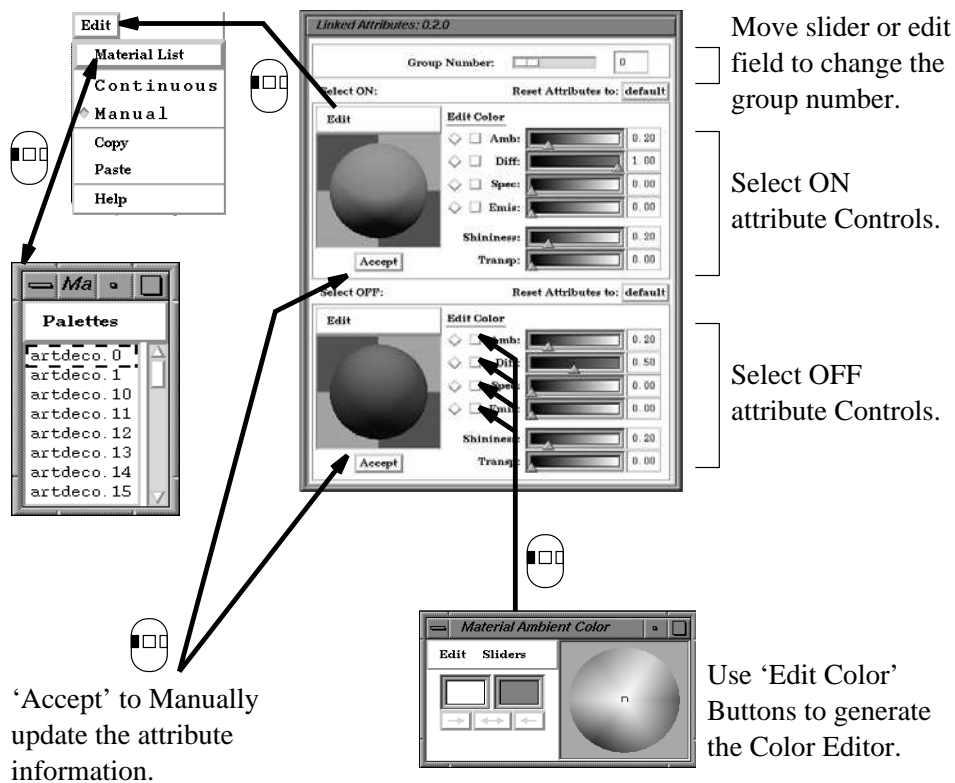
- Linkages States: 0.1.0.0**: A window with a 'Local Self' section containing five toggle buttons: 'Linked Selection', 'Linked Global Transform', 'Linked Group Transform', 'Linked Attributes', and 'Linked Data Probes'. Below these is a 'Link Status' button with a small icon.
- Linked Attributes: 0.1.0.0**: A window for editing attributes, divided into 'Select ON' and 'Select OFF' sections. Each section has an 'Edit' area with a sphere and an 'Edit Color' section with sliders for 'Amb', 'Diff', 'Spec', and 'Emis', and a 'Shininess' slider. An 'Accept' button is at the bottom of each section.
- waltz**: The main application window with a menu bar (Quit, Load) and a toolbar. The toolbar includes an 'Export' button, a 'Link Status' button (the same icon as in the Linkages States window), and other icons for 'Gr O.F.O', 'Ab O.F.O', and 'Ab O.F.O.I'.

Arrows indicate the workflow: from the 'Link Status' button in the main window to the 'Linkages States' window, and from the 'Linked Attributes' button in the 'Linkages States' window to the 'Linked Attributes' window.



8 Editing the Attribute Values

The Linked Attribute popup contains many popups to edit the material type. The material type can be *relayed* back to the abstraction material 'Continuously' (after any change) or 'Manually' (by pressing the Accept button). The Group Number Slider (or field value) being changed to edit the required material.



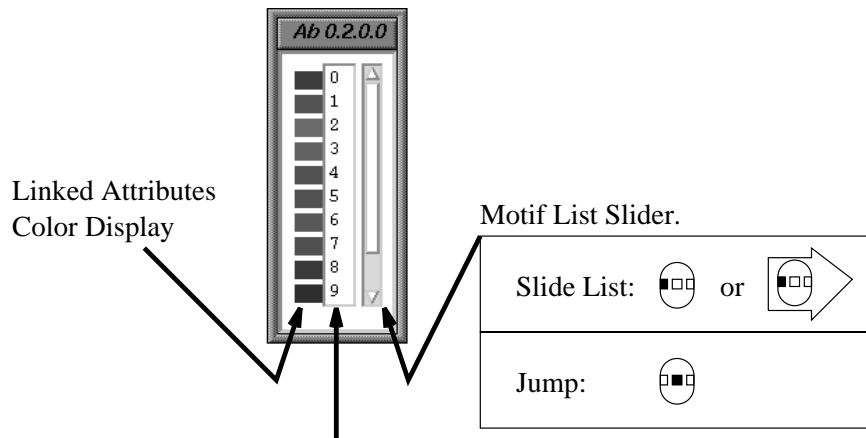


9 Controlling the Abstractions

This version of waltz supports seven abstractions. Each abstraction is inherently linked to any other abstraction. However, some of the linkage types of higher dimensionality make no sense in the lower dimension abstractions and therefore, are not linked. For example the two dimensional slice abstraction ignores the linkage information of Global and Group Transformation. Therefore the abstractions are grouped and explained by dimensionality.

9.1 Abstraction with One Dimension

The list abstraction displays the names and material types of the groups in a list. If there are eleven or more groups a slider is provided to display the unseen values of the list. Singular or multiple list elements can be selected and individual list elements can be toggled.



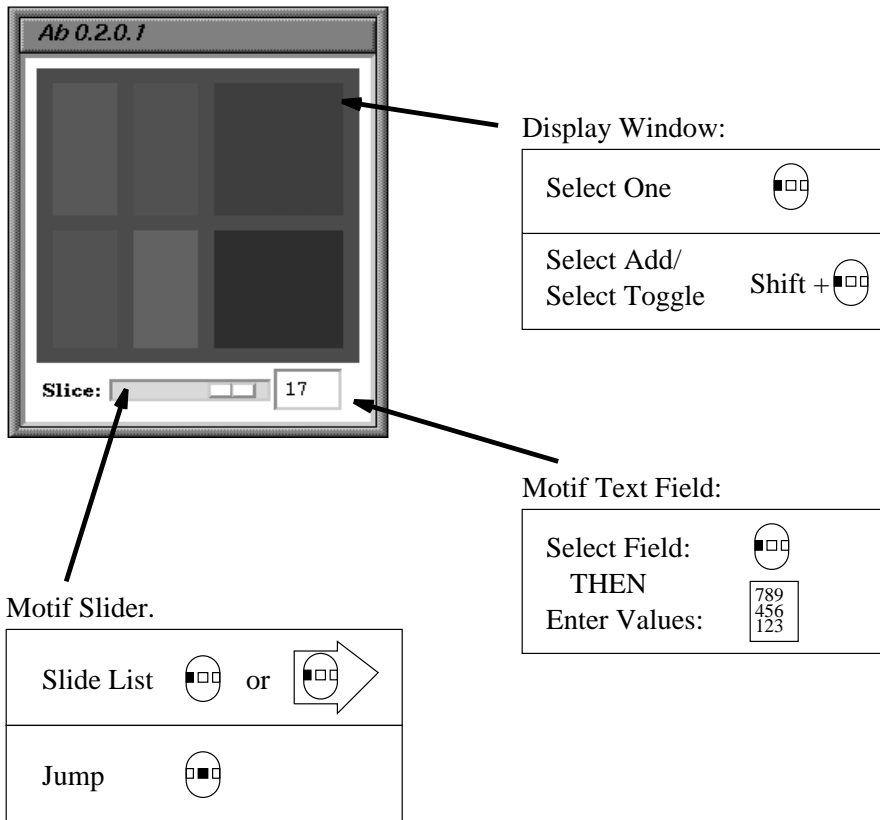
Group Names Selection:

Select One:	or	Select Multiple:	
Select Add/ Select Toggle:	Ctrl +	Toggle Multiple:	Ctrl +
Shift Select Multiple (Selects range of items):	Select One then ..	Shift Select Multiple (Selects range of items):	Shift +



9.2 Abstraction with Two Dimensions

The Slice Abstraction displays slices through the data, along the Z axis. The sliders when there are multiple slice abstractions within one Grouped Abstraction are connected as Linked Probes.





9.3 Abstractions with Three Dimensions

The Bounding Cube, Net-Display, Skeleton and Surface abstractions are controlled similarly. A Jack-manipulator is added to the display (using the middle mouse button) when the Global or Group Transform Linkages are required.

Display Window:
(Bound Cube/Skeleton/Surface)

Selection		
Without Manipulator.		
Select One		
Select Add/ Select Toggle	Shift +	

Global Transform		
Toggle Manipulator		On Empty Space
Reset Manipulator	Shift +	On Empty Space

Group Transform		
Select Manipulator		On Specific Group
Remove Manipulator		On Specific Group
Reset ONE Manipulator	Shift +	On Specific Group
Reset ALL Manipulators	Shift +	On Specific Group

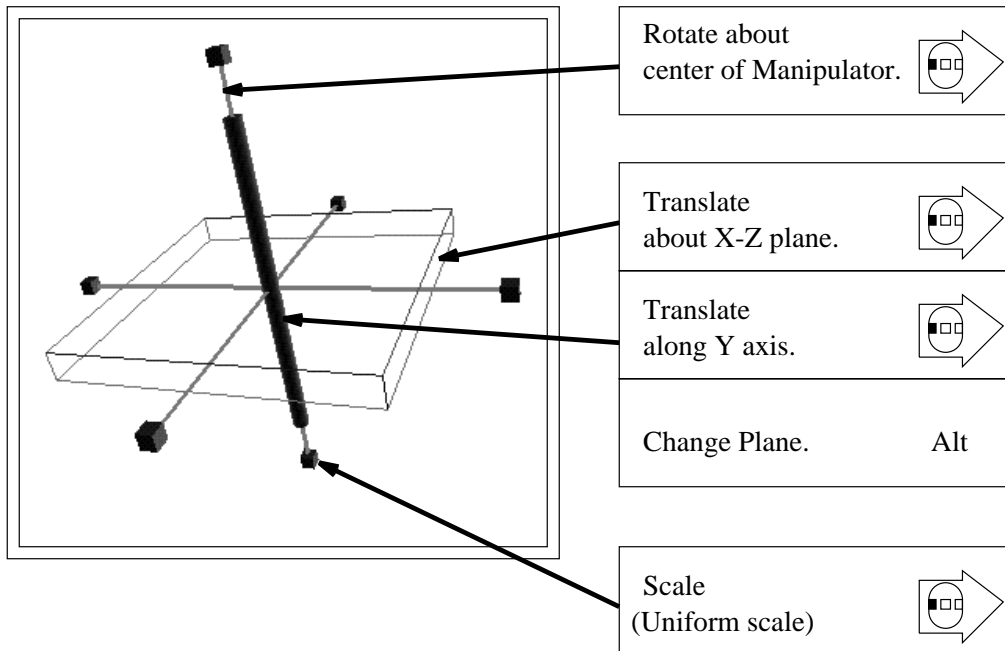
Manipulator:



9.4 Controlling the Jack-Manipulator

The Jack-Manipulator controls the scaling, position (translation) and orientation (rotation) of the surrounded object.

Note: Colors have been inverted!





10 A Session Walkthrough

The following section describes an example walkthrough, explaining the usual progression and order of commands within a Waltz session.

	Description	Page
1	Make sure Auto Window Placement on the window Settings has been selected.	1-1
2	Start a Waltz Session. Resize the window to about quarter the screen size.	1-1
3	Select the Data Menu (under Load menu).	2-1
4	Double click the mouse button on the required file, or select the file (using the left mouse button) and select the OK button.	2-1
5	Export the Data to generate a new Grouped Abstraction Module. Use the right mouse button to select the Export new menu on the Export button of the Data File Module.	3-1
6	Select the Closest Value grouper from the Groupers Menu (excluding group numbers '0' and '1').	4-1
7	Edit the Number of Groups and Closest Value fields to values "5" and "400" respectively. Select the Accept button to initiate the grouper action and wait for the grouper to finish.	5-1
8	Select the List 1D abstraction from the Abstractions menu on the Grouped Abstraction Module.	6-1
9	Select a few group elements from the List abstraction.	4-1
10	Use the right mouse button on the Grouped Abstraction Modules Export button to Export new the data to the next specialization level (that also generates a new Grouped Abstraction Module).	4-1
11	Select the Surface 3D option from the Abstractions menu (in the second Grouped Abstraction Module) to initiate the Surface Abstraction.	6-1
12	Add the Jack manipulator, by pressing the middle button on empty space (in the Surface Abstraction window).	9-1
13	Manipulate the three dimensional image using the Jack Manipulator.	9-4
14	The Linkages (including 'self' color attributes) are altered using the Linked Attributes Form.	7-1
15	The Local color attributes are changed using the Linked Attributes popup from any Grouped Abstraction Module.	5-1
16	Select the Quit option from the Quit menu to finish the Waltz session.	1-1



References

- [Rob95] Jonathan C. Roberts. *Aspects of Abstraction in Scientific Visualization*. Ph.D thesis, Kent University, Computing Laboratory, Canterbury, Kent, England, UK, CT2 7NF, October 1995.
- [Rob96] Jonathan C. Roberts. Waltz User Manual. Technical Report 22-96, Computing Laboratory, University of Kent, Canterbury, UK, December 1996.